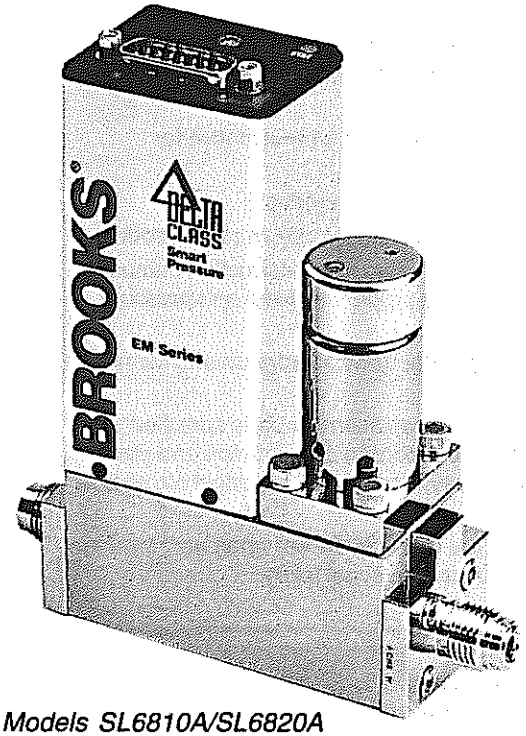
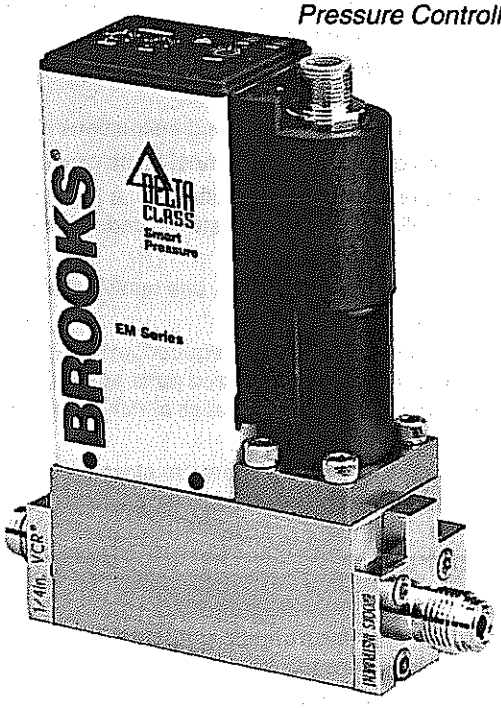
Installation and Operation Manual
X-SL6800-PC
October, 2003
PRELIMINARY

Brooks® Delta Class SL6800 Series Metal Sealed Pressure Controllers



Models SL6810A/SL6820A
Analog I/O,
Pressure Controllers

Models SL6810D/SL6820D
Digital I/O DeviceNet™
Pressure Controller



Brooks Instrument
www.BrooksInstrument.com

EMERSON.
Process Management

Essential Instructions

Read this page before proceeding!

Brooks Instrument designs, manufactures and tests its products to meet many national and international standards. Because these instruments are sophisticated technical products, you must properly install, use and maintain them to ensure they continue to operate within their normal specifications. The following instructions must be adhered to and integrated into your safety program when installing, using and maintaining Brooks Products.

- Read all instructions prior to installing, operating and servicing the product. If this instruction manual is not the correct manual, please see back cover for local sales office contact information. Save this instruction manual for future reference.
- If you do not understand any of the instructions, contact your Brooks Instrument representative for clarification.
- Follow all warnings, cautions and instructions marked on and supplied with the product.
- Inform and educate your personnel in the proper installation, operation and maintenance of the product.
- Install your equipment as specified in the installation instructions of the appropriate instruction manual and per applicable local and national codes. Connect all products to the proper electrical and pressure sources.
- To ensure proper performance, use qualified personnel to install, operate, update, program and maintain the product.
- When replacement parts are required, ensure that qualified people use replacement parts specified by Brooks Instrument. Unauthorized parts and procedures can affect the product's performance and place the safe operation of your process at risk. Look-alike substitutions may result in fire, electrical hazards or improper operation.
- Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent electrical shock and personal injury.

⚠CAUTION

This instrument contains electronic components that are susceptible to damage by static electricity. Proper handling procedures must be observed during the removal, installation or other handling of internal circuit boards or devices.

Handling Procedure:

1. Power to unit must be removed.
2. Personnel must be grounded, via a wrist strap or other safe, suitable means before any printed circuit card or other internal device is installed, removed or adjusted.
3. Printed circuit cards must be transported in a conductive bag or other conductive container. Boards must not be removed from protective enclosure until immediately before installation. Removed boards must immediately be placed in protective container for transport, storage or return to factory.

Comments

This instrument is not unique in its content of ESD (electrostatic discharge) sensitive components. Most modern electronic designs contain components that utilize metal oxide technology (NMOS, CMOS, etc.). Experience has proven that even small amounts of static electricity can damage or destroy these devices. Damaged components, even though they appear to function properly, exhibit early failure.

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1-1 Scope

Thank you for purchasing a Brooks Instrument Model SL6810/SL6820 Pressure Controller. This instruction manual is intended to provide the user with all the information necessary to install, operate and maintain the Brooks Model SL6810/SL6820 Pressure Controller. This manual is organized into sections:

Section 1 - Introduction
Section 2 - Installation
Section 3 - Adjustment and Maintenance
Section A - CE Certification

It is recommended that this manual be read in its entirety before attempting to operate or repair the Model SL6810/SL6820.

1-2 Description

The Brooks Model SL6810/SL6820 Pressure Controller accurately measures and controls upstream or downstream pressures. The heart of the system is a solid-state pressure transducer, which produces an electrical output proportional to pressure. The electronics use this signal to operate the control valve and to provide an output signal.

Brooks SL6810/SL6820 is available with connection to DeviceNet™, a high-speed (up to 500k baud) digital communication network. Brooks DeviceNet device-profile has been certified by the ODVA™ (Open DeviceNet Vendors Association).

The process and command data may be 'wired' either using traditional 5-volt analog connections or digital communications networks; the measurement and control performance is the same.

The SL6810/SL6820 Series microprocessor uses a multi-point calibration to deal with any residual integral sensor non-linearity, yielding a highly accurate process signal.
The SL6810/SL6820 Series family of products utilizes a modular system in both its mechanical and electrical construction. This modularity allows for simplified customer ordering and factory configuration. This flexibility yields products for pressure measurement and control, using either traditional analog connections or leading edge network-communication protocols. Brooks SL6810/SL6820 Series of controllers can directly replace existing analog products with the advantage of improved digital accuracy. Both analog and digital applications will demonstrate settling time and accuracy improvements.

1-3 Principle of Operation

The pressure to be measured acts on a stainless steel diaphragm. This pressure is transmitted to the actual sensing element, a silicon chip (refer to Figure 1-1). The chip consists of an anisotropically etched diaphragm with four piezo resistive resistors, configured in a Wheatstone bridge, etched into its surface (refer to Figure 1-2). The mechanical deformation of this diaphragm results in an imbalance of the resistors, which is proportional to pressure. An amplifier provides output to the control circuit as well as the electrical output signal.

In addition to the pressure transducer the Model SL6810/SL6820 has an integral control valve and control circuitry. A difference between the pressure and set point signals will cause the electronics to modulate the control valve to maintain the desired pressure.
A system block diagram is shown in Figure 1-3.

The integration of pressure transducer, control electronics and control valve into one unit results in a compact size. The mounting dimensions are comparable to a mass flow controller. Refer to Figures 1-4 and 1-5.

The "upstream pressure regulation mode" is shown in Figure 1-6 places the pressure controller at the outlet of the pressure vessel. The pressure in the process upstream of the controller will be constant independent of downstream variation. Pressure measurement and control takes place at the outlet side of the pressure vessel.

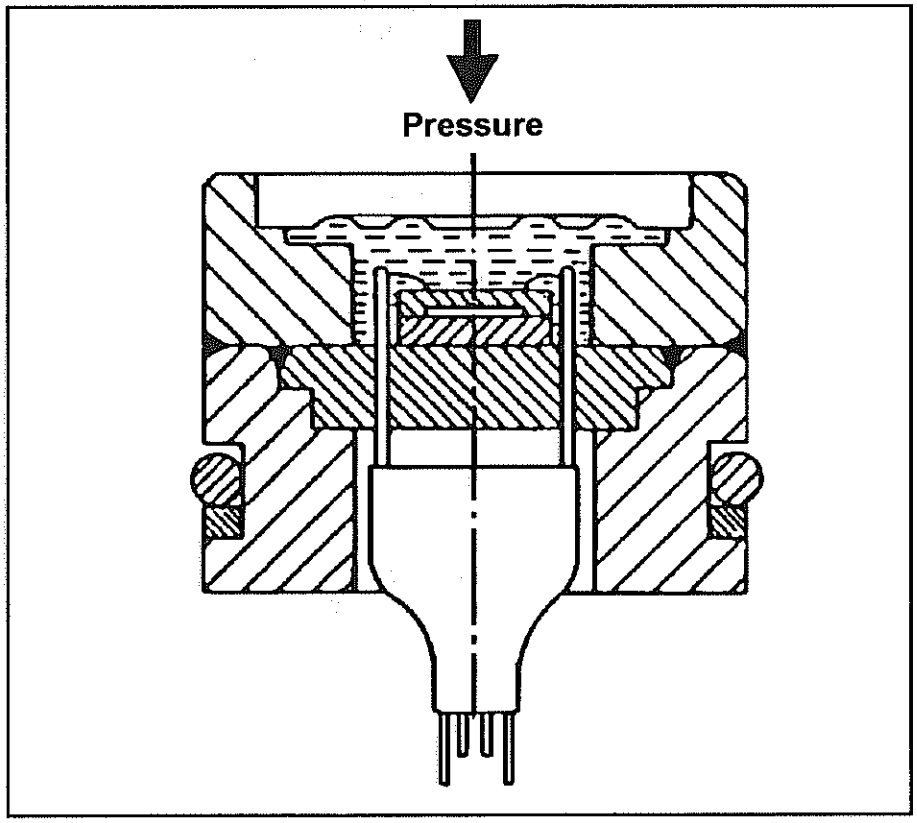

Figure 1-1 Model SL6810/SL6820 Pressure Transducer

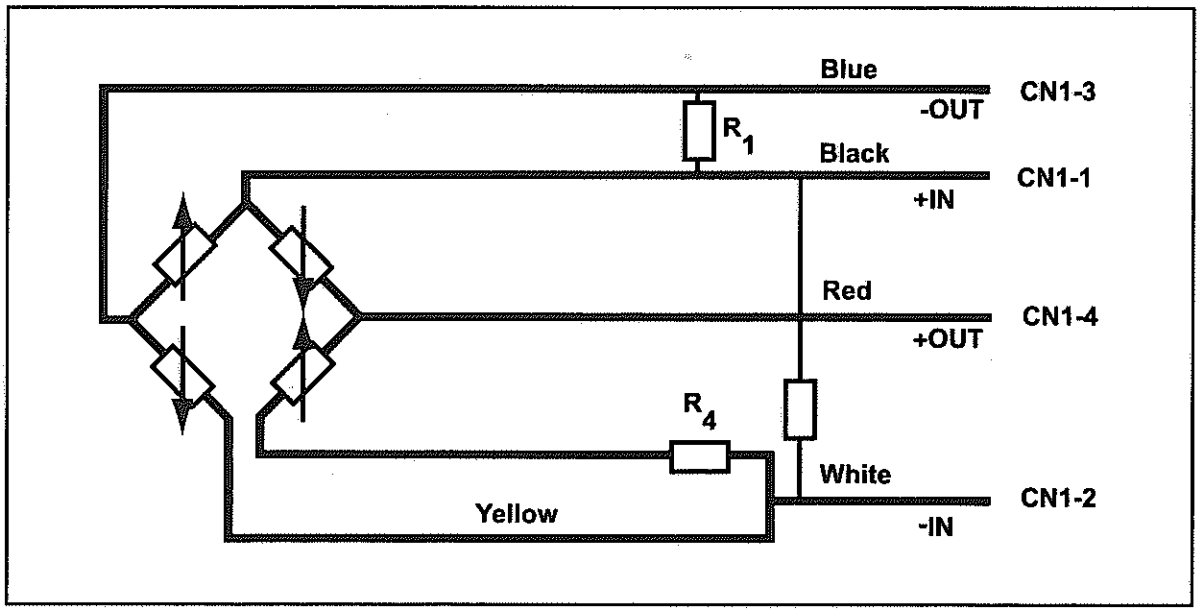

Figure 1-2 Model SL6810/SL6820 Silicon Chip Configuration

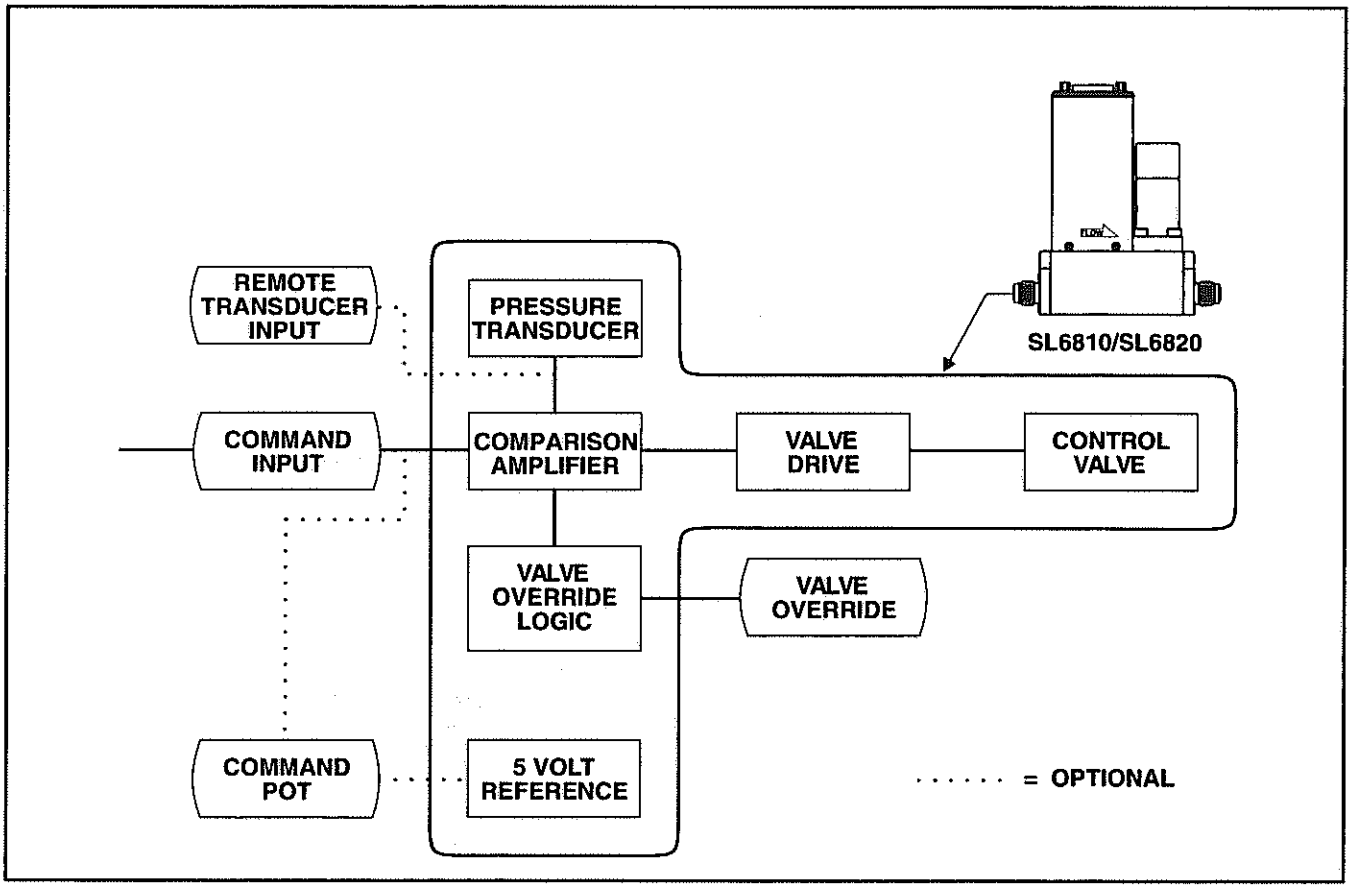

Figure 1-3 Model SL6810/6820 System Block Diagram.

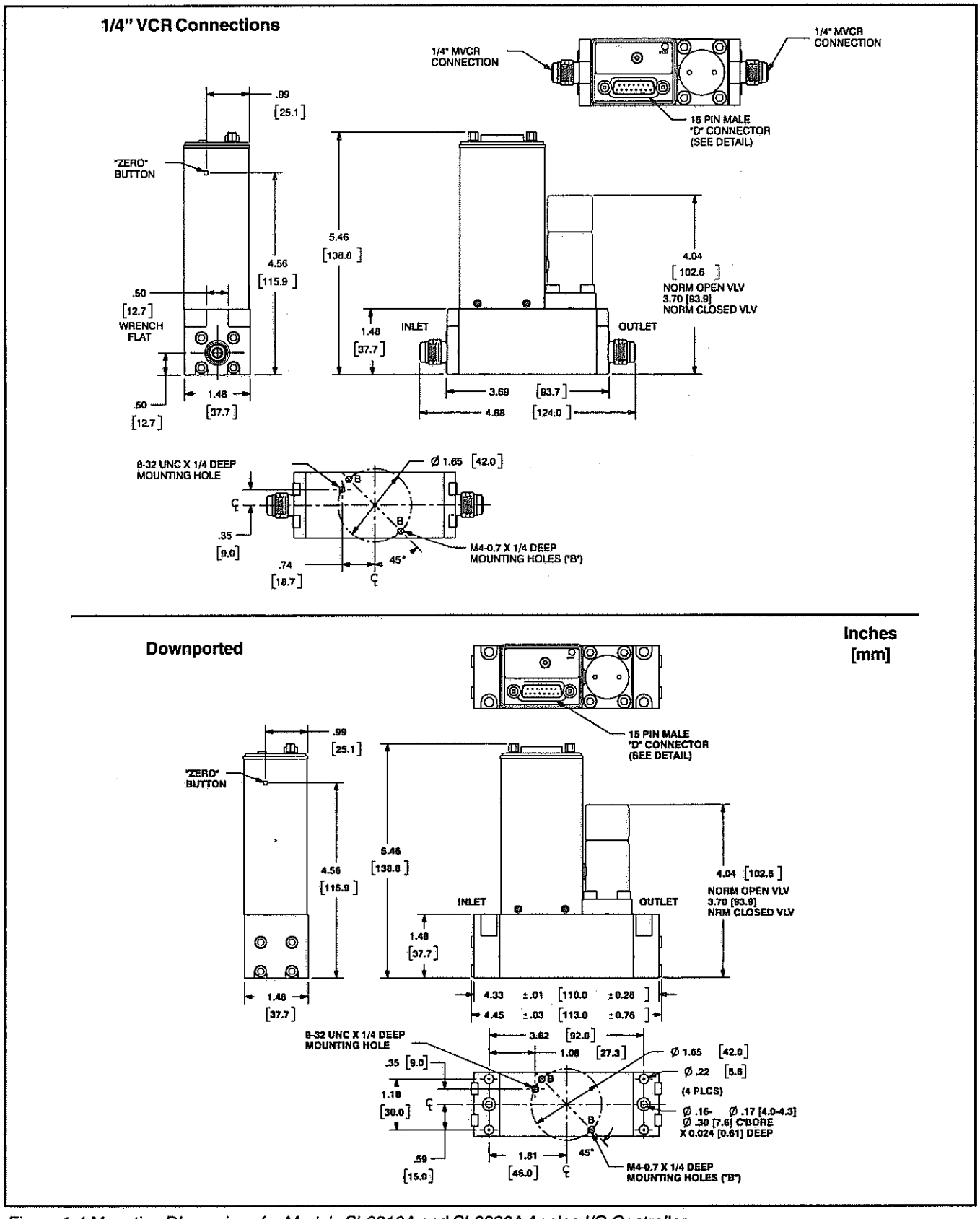

Figure 1-4 Mounting Dimensions for Models SL6810A and SL6820A Analog I/O Controller

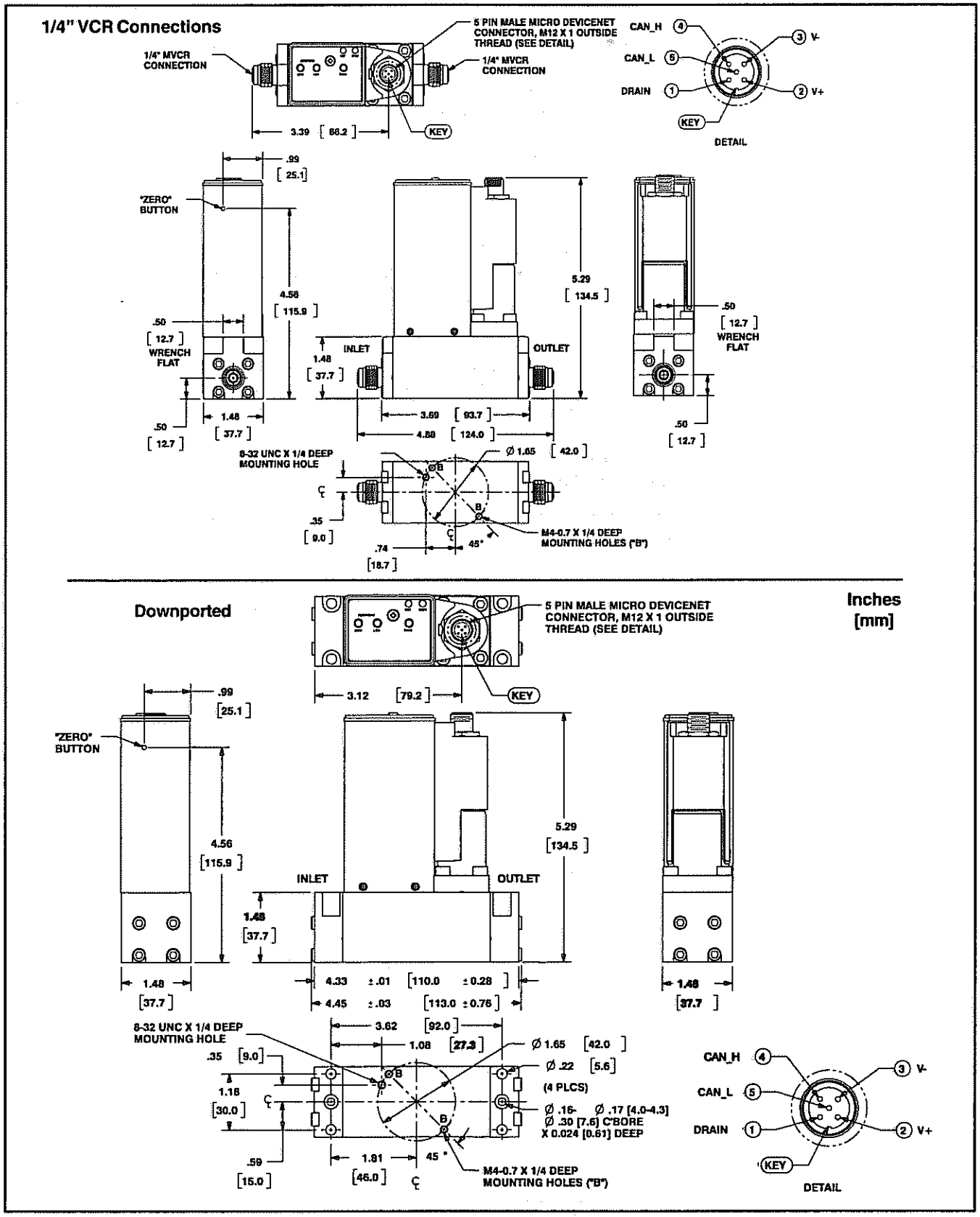

Figure 1-5 Mounting Dimensions for Models SL6810D and SL6820D Digital I/O DeviceNet Controller

When the pressure controller is used in the "downstream pressure regulation" mode as shown in Figure 1-7, the pressure in the process vessel will be constant independent of upstream variation, provided the upstream pressure does not fall below the downstream setting. Pressure measurement and control takes place at the inlet side of the pressure vessel.

The most common application of the pressure controller is in conjunction with a mass flow controller (refer to Figure 1-8). Mass flow controllers accurately measure and control the required quantity of process gas flows. In this figure, the mass flow controllers will supply the desired quantity and mixture of process gas while the pressure controller will maintain the desired reactor pressure by varying the gas outflow. This system allows the process reactants to be varied while maintaining a constant reaction pressure.

The Model SL6810/SL6820 Pressure Controller has proportional and integral control action. The reset or integral control is combined with the proportional control action (normally referred to as P.I. control). Both proportional band and integration time are customer adjustable with a Brooks service tool.

Note: The Controller Mode and valve type are determined at the time of order. Mechanical parts must be changed to convert modes or valve types.

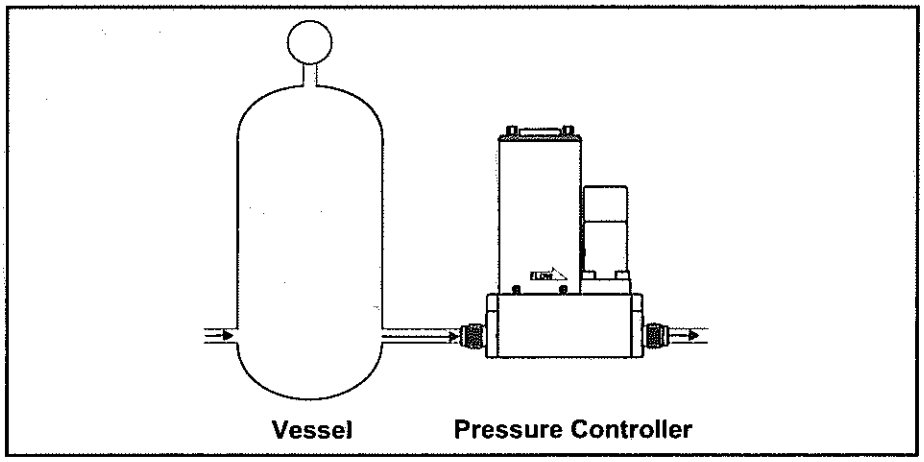

Figure 1-6 Model SL6820 Controller Upstream

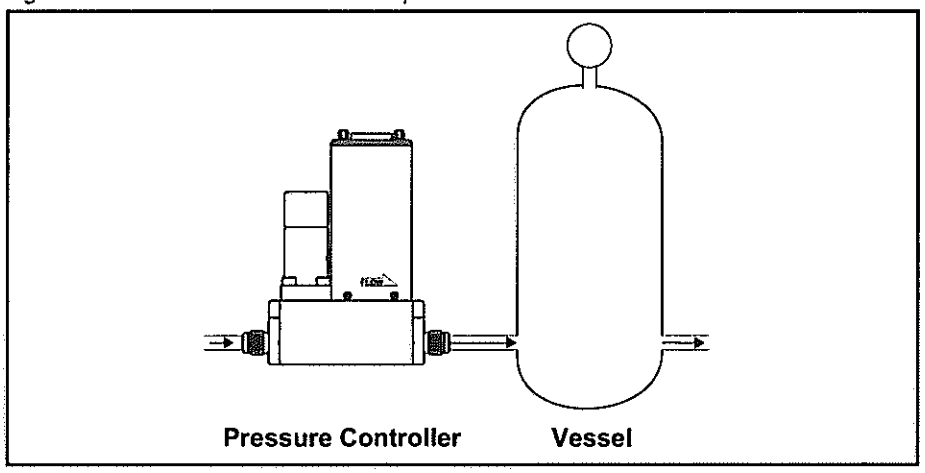

Figure 1-7 Model SL6810 Controller Downstream

Upstream Controller Mode - The controller is set to maintain the upstream process pressure constant, independent of downstream pressure or flow variations (ref. Fig. 1-6). This is factory configured.

Downstream Controller Mode The controller is set to maintain the downstream process pressure constant, independent of upstream pressure or flow variations. This is factory configured.

Normally Open/Normally Closed Control Valve - Both Normally Open (N.O.) and Normally Closed (N.C.) configurations are available. Normally Closed is the standard valve type. The Normally Open valve may be specified when Safety, Operation or Process considerations warrant this type of valve.

Voltage Inputs/Outputs are factory configured and available on the analog version of the device. This must be specified when ordered.

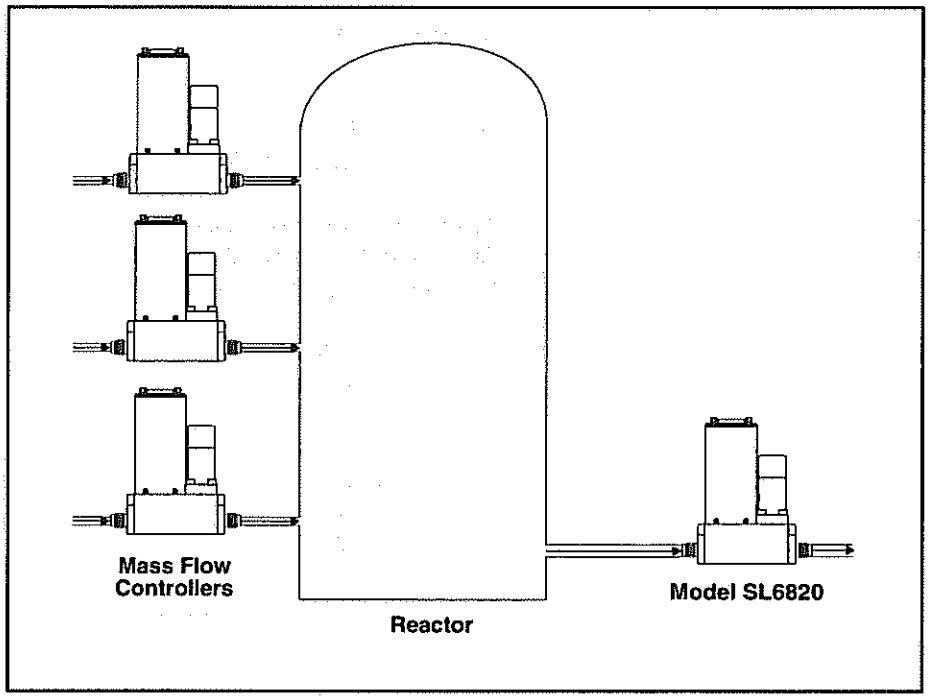

Figure 1-8 Typical Application of Upstream Controller

1-4 Specifications

Pressure Ranges
7.25 psia to 290 psia full scale (Metal Seals)

Flow Rates
0-30,000 sccm* (Nitrogen Equivalent).
*Standard pressure and temperature in accordance with SEMI (Semiconductor Equipment and Materials Institute) standard: 32°F (0°C) and 101 kPa (760 Torr). Other reference conditions available upon request.

Accuracy
±0.5% F.S., including linearity and hysteresis for precision control

Repeatability
±0.1% full scale

Control Range
20:1

Zero Stability
0.01% full scale per 30 days

Ambient Temperature Limits
Operating: 0°C to 60°C (32°F to 140°F)
Non-operating: -25°C to 100°C (-13°F to 212°F)

Temperature Sensitivity
±0.1% of F.S. per °C

Maximum Transducer Pressure
21.75 psia for 0-14.5 psia range
108.5 psia for 14.5-72.5 psia range
435 psia for 72.5-290 psia range

Maximum Design Pressure
1,450 psig

Pressure Equipment Directive (PED) 97/23/EC:
Equipment falls under Sound Engineering Practice (SEP)

Maximum Fluid Operating Temperature
0°C to 65°C (32°F to 149°F)

Leak Integrity
Inboard to Outboard: 1x10-10 atm scc/sec Helium max.

1-5 Controller Specifications

Digital software
Can store 10 selectable P and I settings.

Input/Output Offset
< 0.2% full scale (voltage)

Proportional Gain
User adjustable via Service port or over DeviceNet interface.

Integration Time
User adjustable via Service port or over DeviceNet interface.

Control Action
Upstream or downstream pressure control

Materials of Construction
316L Vacuum Arc Remelt (VAR), 316L, and high-alloy
ferritic stainless steel.
External/internal seals: nickel
Valve seat: 316L stainless steel
Internal wetted Surface Finish 32 Ra.

Electrical Connections
Analog I/O option: 15-pin, male
Digital I/O DeviceNet option: 5-pin Micro-Connector, male
Power Supply Voltage
Analog option: +15 Vdc, ±5%
(traditional -15 Vdc pin is ignored)
Digital I/O DeviceNet option: 11-25 Vdc nominal = +24 Vdc

Power Requirements
Analog I/O option, with valve: 3.6 Watts Typical, 4.0 Watts Max.
Digital I/O DeviceNet option, w/valve: 6.9 Watts Typical, 7.6 Watts Max

Class III Equipment: The dc Mains input shall be supplied from a SELV (Separated Extra-Low Voltage) source.

Output Signals
Pressure Output (Analog I/O option only)
0-5 Vdc into 2 K ohm-minimum load. Output will indicate process-variable up to 6 Vdc (120% F.S.).

5 Volt Reference Output
5 Volts ±0.2% min Load 1 K ohms.

Pressure Setpoint Signals
Command-Setpoint Input (Analog I/O option only)
0-5 Vdc: Input will accept signals to 5.5 Vdc (110% F.S.).
Input resistance: 825 K ohm nominal.

Process Connections
Standard inlet and outlet connections supplied on the Model SL6810 and Model SL6820 are 1/4"(M) VCR™
Optional C Seal Downport (semi spec. 2787.1 4/99)
Optional CS Seal Downport (semi spec. 2787.5 4/99)

Environmental Conditions

Installation Category: "I"

Pollution Degree: 2

Humidity: 50-80% Relative Humidity

Meter Altitude: 6562 feet (2,000 meters)

For Indoor Use ONLY

Mains supply voltage fluctuations not to exceed ±10% of the nominal voltage

Valve Override Signal (Analog I/O option only)

IF Left floating, unconnected or grounded instrument controls valve to setpoint.

IF Connected to signal at or above 10.0 Volts, valve is forced open.
IF Connected to signal at or below 0.0 Volts, valve is forced closed.

2-1 General

This section contains the procedures for the receipt and installation of the instrument. Do not attempt to start the system until the instrument has been permanently installed. It is extremely important that the start-up procedures be followed in the exact sequence presented.

2-2 Receipt of Equipment

When the instrument is received, the outside packing case should be checked for damage incurred during shipment. If the packing case is damaged, the local carrier should be notified at once regarding his liability. A report should be submitted to your nearest Product Service Department.

Brooks Instrument
407 W. Vine Street
P.O. Box 903
Hatfield, PA 19440 USA
Toll Free (888) 554-FLOW (3569)
Tel (215) 362-3700
Fax (215) 362-3745
E-mail: BrooksAm@EmersonProcess.com
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Brooks Instrument B.V.
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Emerson Process Management
Brooks Division
1-4-4 Kitasuna Koto-Ku
Tokyo, 136-0073 Japan
Tel 011-81-3-5633-7105
Fax 011-81-3-5633-7124
E-mail BrooksAs@EmersonProcess.com

Remove the envelope containing the packing list. Carefully remove the instrument from the packing case. Make sure spare parts are not discarded with the packing materials. Inspect for damaged or missing parts.

2-3 Recommended Storage Practice

If intermediate or long-term storage of equipment is required, it is recommended that the equipment be stored in accordance with the following:

a. Within the original shipping container.
b. Stored in a sheltered area, preferably a warm, dry, heated warehouse.
c. Ambient temperature of 70° F (21° C) nominal, 109° F (43° C) maximum, 45° F (7° C) minimum.
d. Relative humidity 45% nominal, 60% maximum, 25% minimum.
Upon removal from storage a visual inspection should be conducted to verify the condition of equipment is "as received".

2-4 Return Shipment

Prior to returning any instrument to the factory, contact your nearest Brooks location for a Return Materials Authorization Number (RMA#). This can be obtained from one of the following locations:

Brooks Instrument
407 W. Vine Street
P.O. Box 903
Hatfield, PA 19440 USA
Toll Free (888) 554-FLOW (3569)
Tel (215) 362-3700
Fax (215) 362-3745
E-mail: BrooksAm@EmersonProcess.com
http://www.brooksinstrument.com

Brooks Instrument B.V.
Groeneveldselaan 6
P.O. Box 56
3900 AB Veenendaal, Netherlands
Tel 31-318-549-549
Fax 31-318-549-559
E-mail: BrooksEu@EmersonProcess.com

Emerson Japan, Ltd.
Emerson Process Management
Brooks Division
1-4-4 Kitasuna Koto-Ku
Tokyo, 136-0073 Japan
Tel 011-81-3-5633-7105
Fax 011-81-3-5633-7124
E-mail: BrooksAs@EmersonProcess.com

Any instrument returned to Brooks requires completion of Form RPR003-1, Brooks Instrument Decontamination Statement, as well as, a Material Safety Data Sheet (MSDS) for the fluid(s) used in the instrument. This is required before any Brooks Personnel can begin processing. Copies of the form can be obtained from any Brooks Instrument location listed above.

2-5 Transit Precautions

To safeguard against damage during transit, transport the instrument to the installation site in the same container used for transportation from the factory if circumstances permit.

2-6 Typical Configurations

A pressure controller system can be built in upstream or downstream control configurations (refer to Figures 1-5 and 1-6). When the controller is placed downstream (upstream pressure controller) of the pressure vessel, the flow is usually determined by the MFC(s) in the line upstream of the vessel.

With the pressure controller upstreamof the vessel (downstream pressure controller), the most likely application is controlling a subatmospheric pressure in the vessel. The inlet of the pressure controller can be at atmospheric gas pressure or at vapor pressure of a liquid source. The flow in this situation is usually determined by the characteristics of a vacuum pump.

2-7 Gas Process Connections

Standard inlet and outlet connections supplied on the Model SL6810 and Model SL6820 are 1/4"(M) VCR. Prior to installation ensure all piping is clean and free from obstructions. Install piping in such a manner that permits easy access to the instrument if removal becomes necessary.

2-8 Installation Procedures

⚠ WARNING

Do not operate this instrument in excess of the specifications listed in section 1. Failure to heed this warning can result in serious personal injury and/or damage to the equipment.

⚠ CAUTION

When installing the instrument, insure that no foreign materials enter the inlet or outlet of the meter. Do not remove the protective end caps until time of installation.

⚠ CAUTION

Any Brooks Instrument pressure controller with a 15 pin D-Connector PC Board bearing the "CE Mark" must use a 100% shielded cable and metal shell mating connectors. The shield is tied over 360 degrees to the shell at both ends. This is mandatory to be in compliance with the EMC Directive 989/336/EEC).

Installation Procedures

a. The Model SL6810/SL6820 should be located in a clean, dry atmosphere relatively free from shock and vibration.
b. Leave sufficient room for access to the electrical components.
c. Install in such a manner that permits easy removal if the instrument requires cleaning.
d. The Model SL6810/SL6820 pressure controller may be installed in any position.

Note: The control valve in the Model SL6810/SL6820 provides precision control and is not designed for positive shut-off. If positive shut-off is required, it is recommended that a separate shut-off valve be installed in-line.

⚠ CAUTION

When used with a reactive (sometimes toxic) gas, contamination or corrosion may occur as a result of plumbing leaks or improper purging. Plumbing should be checked carefully for leaks and the controller purged with dry nitrogen before use. See Brooks' Technical Bulletin T-086 for further information.

⚠ CAUTION

Since the Control Valve is not a positive shut-off, a seperate solenoid valve may have been installed for that purpose. It should be noted that a small amount of gas may be trapped between the downstream side of the pressure controller and the solenoid, resulting in a surge upon opening of the solenoid valve. This surge can be reduced in magnitude by locating the controler and solenoid valve close together

2-9 In-Line Filter

It is recommended that an in-line filter, such as the Brooks Model 5848, be installed upstream from the controller to prevent the possibility of any foreign material entering the meter. The filter porosity should be approximately ten times smaller than the orifice used in the installation, however, it is recommended that the minimum porosity that does not restrict the flow rate being used. The filtering element should be periodically replaced or cleaned.

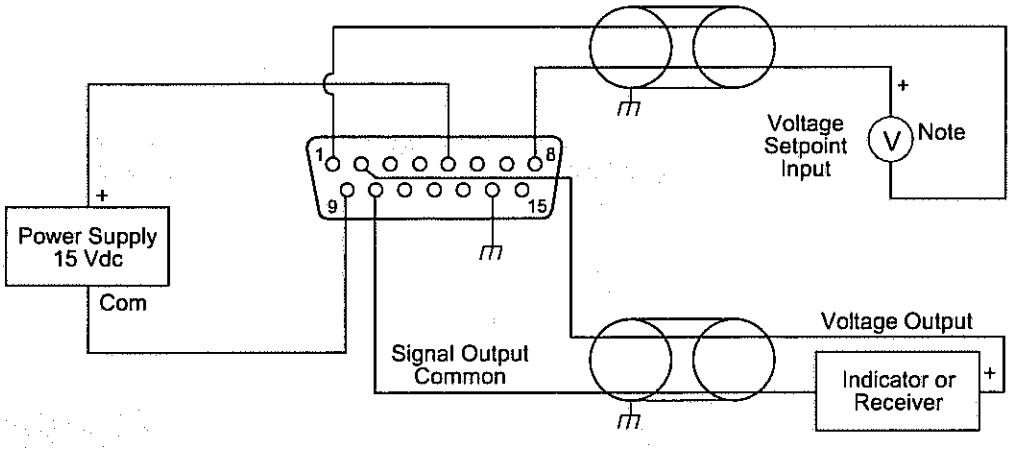
2-10 Electrical Interface

Electrical Interface Analog Mode

Standard inlet and outlet connections supplied on the Model SL6810 and Model SL6820 are 1/4"(M) VCR. Prior to installation ensure all piping is clean and free from obstructions. Install piping in such a manner that permits easy access to the instrument if removal becomes necessary.
To insure proper operation, the Model SL6810/SL6820 must be connected per Figure 2-1. As a minimum, the following connections must be made for new installations.

Pin Number	Description
1	Command Common
2 or 4	Signal Output
5	+15 Vdc Supply
6	-15 Vdc (Not internally Connected)
8	Command Input
9	Supply Voltage Common
10	Voltage Signal Common
13	+15 Vdc Supply (Current I/O)

Note: The Command Return is internally connected to Signal Return and Supply Voltage Common.



Voltage Signal: Setpoint and Output

Notes:
1. The commons for the setpoint input and signal output are not isolated from power supply common.
2. Tie cable shields should connect to ground at one end only.(MFC only)

Figure 2-1 Common Electrical Connections, Analog I/O

Electrical Interface DeviceNet Mode
Electrical interface in DeviceNet mode is covered in the DeviceNet™ Supplemental Manual for Brooks Instrument Delta Class MFC's/MFM's, X-DeltaDeviceNet.

2-11 Remote Setpoint (Command) Input Analog Mode

If the pressure controller will be commanded by an external voltage or current signal, the command potentiometer is not used.
The command hookup is as follows:

a. Voltage Signal: Connect the external command signal to Terminal 8 and the external command return to Terminal 1. Refer to Figure 2-1.
b. Note: The command return is internally connected to signal return and power supply common. Current supplied by the device providing the set point will not be returned on the current loop.

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3-1 Proportional Band and Integration Time Constant Adjustment

The Model SL6810/SL6820 Pressure Controller has proportional and integral control action. The reset, or integral, control is combined with the proportional control actions, commonly referred to as P.I. control. Both proportional band and integration time are user adjustable by using special commands over a DeviceNet connection or using Brooks Service Software. The dynamic behavior of the control system is influenced by flow range, pressure range, fluid type, orifice size and system volume. Therefore, the pressure controller may need adjustment in the field to achieve the best dynamic response.

The factory settings usually result in stable control. For most systems the dynamic response is adequate with the factory settings. Improved response can be had by final tuning the P. and I. software parameters in the intended application by the user. The tuning of the P. and I. constants does not affect the calibration of the instrument.

Definitions

Both proportional and integral control actions are defined with respect to a step response error signal. The error signal is the difference between the actual pressure and the setpoint. Since no control system is instantaneous, an error signal will be present while the controller is attempting to reach setpoint.

The SL6810 and SL6820 employ digital P.I. controls. There are no potentiometers to adjust these values.

Proportional Control

Proportional control is a basic continuous control mode in which the controller output is proportional to the error input signal to the controller. It provides very rapid response and is relatively stable. Used alone, proportional control has one disadvantage: at steady state; it exhibits an offset. That is there is a difference between the desired value, or setpoint and the actual value of the controlled variable. An integral action added to the proportional mode eliminates offset.

Proportional control is sometimes called proportional gain. The gain of the controller is high when the error is large, and low when the error is small.

Integral Control

Integral or reset action is an integration of the input error signal over time. This means that with integral action the value of the manipulated variable changes at a rate proportional to the error. With integral action present there can be no offset at steady state since the manipulated variable will continue to change as long as an error is present.

Characteristics of P.I. Control

By using both proportional and integral control actions, rapid control can be achieved with out a steady state offset. Typically there is a slight decrease in system stability due to the presence of the integral mode. The dynamic response of the system is better than the response would be with integral alone. Because the two controller modes are interactive the P.I. controller is somewhat more difficult to tune.

Tuning the P.I. control

Using the Brooks Service tool, read the current values of P. and I. It is highly recommended that the P. and I. values be recorded before adjustment. This will allow easy return to the factory settings. The Brooks Service tool is covered in another document. Increasing the P. parameter will increase the proportional band thus increasing the system response time. If the proportional band is too high, the system may overshoot the command, or oscillate.

Increasing the Integral parameter will increase the integration time, making the system respond slower, but more stable.

Most applications require fast response time. This can be achieved by using a low Integral number and a high Proportional number. P. and I. should be adjusted so the controller reaches setpoint in the minimum time, without overshoot or oscillation.

Check the adjustment in the system over the expected range of pressures and flows.

3-2 Basic Troubleshooting

A. System Checks

The Model SL6810/SL6820 is generally used as a component in gas handling systems, which can be quite complex. This can make the task of isolating a malfunction in the system a difficult one. An incorrectly diagnosed malfunction can cause many hours of unnecessary down time. If possible, make the following system checks before removing a suspected defective pressure controller for bench troubleshooting or return to the factory, especially if the system is new.

1. Verify a low resistance common connection and that the correct power supply voltage and signals are reaching and leaving the controller (for Analog I/O). The Break-out Board (P/N S-273-Z-649-AAA) will make this job much easier.
2. Verify that the process gas connections have been correctly terminated and leak checked.
3. If the pressure controller appears to be functioning but cannot achieve setpoint, verify that sufficient inlet pressure and pressure drop are available at the controller to provide the required flow.

B. Bench Testing

A basic bench test can be performed to isolate the cause of a problem or to verify the proper operation of the pressure controller. This method can be used if the full scale calibration pressure of the Pressure Controller is greater than 14.7 psia (atmospheric).

1. Connect the Pressure controller to the appropriate power supply as required for either Analog or DeviceNet.
2. Apply power to the pressure controller.
3. If possible, keep both the inlet and outlet side of the pressure controller exposed to atmospheric pressure. A gas source is not necessary at this time.
4. Calculate the estimated output from the pressure controller as follows:

    a. Take the pressure value at atmosphere and divide it by the pressure controller's full scale calibration value. Note: the units of measure must be consistant.
    b. Multiply the result by the appropriate unit of measure that represents the pressure controller's 100% full scale output.
    c. Compare the calculated result to the actual output of the pressure controller. These two values should be within ± 5% of each other.
    d. If they are not within ±5%, the pressure controller is not measuring accurately.
    e. Contact Brooks Factory service for disposition. Do not attempt to disassemble the sensor.

Example of calculations (Analog Version)

a. Pressure controller is calibrated to 1000 torr full scale
b. A 5-volt output represents 1000 torr.
c. When the pressure controller is open to atmosphere, the actual output signal from the pressure controller is 3.78 Volts DC.
d. The calculated analog output is: (760 torr/1000 torr) x 5 VDC= 3.80 Vdc.
e. The actual output of the pressure controller is within 5% of the calculated value.

Example of calculations (DeviceNet Version)

a. Pressure controller is calibrated to 1000 torr full scale.
b. 100% output equals 1000 torr.
c. When the pressure controller is open to atmosphere, the actual output signal from the pressure controller is 78%. (760 torr=1 atmosphere)
d. The calculated analog output is: (760 torr/1000 torr) x 100%= 76%
e. The actual output of the pressure controller is within 5% of the calculated value.

If the pressure controller output is within limits, the problem is in the control valve or the system itself. Please contact Brooks Instrument for further recommendations.

C. Disassembly

It is not practical to disassemble the controller in the field. The spacing between the valve and the orifice is critical and could change when disassembled and reassembled. New screws and metal seals must be used for all pressure boundary components.

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Dansk

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Emne : Tillæg til instruktions manual.
Reference : CE mærkning af Masse Flow udstyr
Dato : Januar-2000.

Brooks Instrument har gennemført CE mærkning af elektronisk udstyr med succes, i henhold til regulativet om elektrisk støj (EMC direktivet 89/336/EEC).
Der skal dog gøres opmærksom på benyttelsen af signalkabler i forbindelse med CE mærkede udstyr.
Kvaliteten af signal kabler og stik:
Brooks lever kabler af høj kvalitet, der imødekommer specifikationerne til CE mærkning.
Hvis der anvendes andre kabel typer skal der benyttes et skærmet kabel med hel skærm med 100% dækning.
Forbindelses stikket type "D" eller "cirkulære", skal være skærmet med metalhus og eventuelle PG-forskruninger skal enten være af metal eller metal skærmet.
Skærmen skal forbindes, i begge ender, til stikkets metalhus eller PG-forskruningen og have forbindelse over 360 grader.
Skærmen bør være forbundet til jord.
"Card Edge" stik er standard ikke af metal, der skal derfor ligeledes benyttes et skærmet kabel med hel skærm med 100% dækning.

Skærmen bør være forbundet til jord.
Forbindelse af stikket; venligst referer til vedlagte instruktions manual.
Med venlig hilsen,

Deutsch

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440

U.S.A.
Subject : Nachtrag zur Bedienungsanleitung.
Referenz : CE Zertifizierung für Massedurchflußgeräte
Datum : Januar-2000.

Nach erfolgreichen Tests enstprechend den Vorschiften der Elektromagnetischen Verträglichkeit (EMC Richtlinie 89/336/EEC) erhalten die Brooks-Geräte (elektrische/elektronische Komponenten) das CE-Zeichen.
Bei der Auswahl der Verbindungskabel für CE-zertifizierte Geräte sind spezielle Anforderungen zu beachten.
Qualität der Verbindungskabel, Anschlußstecker und der Kabeldurchführungen
Die hochwertigen Qualitätskabel von Brooks entsprechen der Spezifikation der CE-Zertifizierung.
Bei Verwendung eigener Verbindungskabel sollten Sie darauf achten, daß eine
100 %igenSchirmababdeckung des Kabels gewährleistet ist.
·"D" oder "Rund" -Verbindungsstecker sollten eine Abschirmung aus Metall besitzen.
Wenn möglich, sollten Kabeldurchführungen mit Anschlußmöglichkeiten für die Kabelabschrimung verwendet werden.
Die Abschirmung des Kabels ist auf beiden Seiten des Steckers oder der Kabeldurchführungen über den vollen Umfang von 360 ° anzuschließen.
Die Abschirmung ist mit dem Erdpotential zu verbinden.
Platinen-Steckverbindunger sind standardmäßige keine metallgeschirmten Verbindungen. Um die Anforderungen der CE-Zertifizierung zu erfüllen, sind Kabel mit einer 100 %igen Schirmababdeckung zu verwenden.

Die Abschirmung ist mit dem Erdpotential zu verbinden.
Die Belegung der Anschlußpins können Sie dem beigelegten Bedienungshandbuch entnehmen.

English

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Subject : Addendum to the Instruction Manual.
Reference : CE certification of Mass Flow Equipment
Date : January-2000.

The Brooks (electric/electronic) equipment bearing the CE mark has been successfully tested to the regulations of the Electro Magnetic Compatibility (EMC directive 89/336/EEC).
Special attention however is required when selecting the signal cable to be used with CE marked equipment.
Quality of the signal cable, cable glands and connectors:
Brooks supplies high quality cable(s) which meets the specifications for CE certification.
If you provide your own signal cable you should use a cable which is overall completely screened with a 100% shield.
"D" or "Circular" type connectors used should be shielded with a metal shield. If applicable, metal cable glands must be used providing cable screen clamping.
The cable screen should be connected to the metal shell or gland and shielded at both ends over 360 Degrees.
The shield should be terminated to a earth ground.
Card Edge Connectors are standard non-metallic. The cables used must be screened with 100% shield to comply with CE certification.

The shield should be terminated to a earth ground.
For pin configuration : Please refer to the enclosed Instruction Manual.

Español

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Asunto : Addendum al Manual de Instrucciones.
Referencia : Certificación CE de los Equipos de Caudal Másico
Fecha : Enero-2000.

Los equipos de Brooks (eléctricos/electrónicos) en relación con la marca CE han pasado satisfactoriamente las pruebas referentes a las regulaciones de Compatibilidad Electro magnética (EMC directiva 89/336/EEC).
Sin embargo se requiere una atención especial en el momento de seleccionar el cable de señal cuando se va a utilizar un equipo con marca CE
Calidad del cable de señal, prensaestopas y conectores:
Brooks suministra cable(s) de alta calidad, que cumple las especificaciones de la certificación CE .
Si usted adquiere su propio cable de señal, debería usar un cable que esté completamente protegido en su conjunto con un apantallamiento del 100%.
Cuando utilice conectores del tipo "D" ó "Circular" deberían estar protegidos con una pantalla metálica. Cuando sea posible, se deberán utilizar prensaestopas metálicos provistos de abrazadera para la pantalla del cable.
La pantalla del cable deberá ser conectada al casquillo metálico ó prensa y protegida en ambos extremos completamente en los 360 Grados.
La pantalla deberá conectarse a tierra.
Los conectores estandar de tipo tarjeta (Card Edge) no son metálicos, los cables utilizados deberán ser protegidos con un apantallamiento del 100% para cumplir con la certificación CE.

La pantalla deberá conectarse a tierra.
Para ver la configuración de los pines: Por favor, consultar Manual de Instrucciones adjunto.

Français

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Sujet : Annexe au Manuel d'Instructions.
Référence : Certification CE des Débitmètres Massiques à Effet Thermique.
Date : Janvier 2000.

Messieurs,
Les équipements Brooks (électriques/électroniques) portant le label CE ont été testés avec succès selon les règles de la Compatibilité Electromagnétique (directive CEM 89/336/EEC).
Cependant, la plus grande attention doit être apportée en ce qui concerne la sélection du câble utilisé pour véhiculer le signal d'un appareil portant le label CE.
Qualité du câble, des presse-étoupes et des connecteurs:
Brooks fournit des câbles de haute qualité répondant aux spécifications de la certification CE.
Si vous approvisionnez vous-même ce câble, vous devez utiliser un câble blindé à 100 %.
Les connecteurs « D » ou de type « circulaire » doivent être reliés à la terre.
Si des presse-étoupes sont nécessaires, ceux ci doivent être métalliques avec mise à la terre.
Le blindage doit être raccordé aux connecteurs métalliques ou aux presse-étoupes sur le pourtour complet du câble, et à chacune de ses extrémités.
Tous les blindages doivent être reliés à la terre.
Les connecteurs de type « card edge » sont non métalliques. Les câbles utilisés doivent être blindés à 100% pour satisfaire à la réglementation CE.

Tous les blindages doivent être reliés à la terre.
Se référer au manuel d'instruction pour le raccordement des contacts.

Greek

Brooks Instrument
407 West Vine St. Hatfield, PA 19440
U.S.A.

Θέμα :Προσθήκη στο Εγχειρίδιο Οδηγιών.
Σχετικά :Πιστοποίηση CE των Οργάνων Μέτρησης Παροχής Μάζας.
Ημερομηνία :Ιανουάριος - 1996

Κυρίες και Κύριοι,

Τα όργανα (ηλεκτρικά/ηλεκτρονικά) της Brooks τα οποία φέρουν το σήμα CE έχουν επιτυχώς ελεγχθεί σύμφωνα με τους κανονισμούς της Ηλεκτρο-Μαγνητικής Συμβατότητας (EMC ντιρεκτίβα 89/336/EEC).
Οπωσδήποτε χρειάζεται ειδική προσοχή κατά τήν επιλογή του καλωδίου μεταφοράς του σήματος το οποίο (καλώδιο) πρόκειται να χρησιμοποιηθεί με όργανα που φέρουν το σήμα CE.

Ποιότητα του καλωδίου σήματος των στυπιοθλιπτών και των συνδέσμων .

Η Brooks κατά κανόνα προμηθεύει υψηλής ποιότητας καλώδια τα οποία πληρούν τις προδιαγραφές για πιστοποίηση CE.
Εάν η επιλογή του καλωδίου σήματος γίνει από σας πρέπει να χρησιμοποιήσετε καλώδιο το οποίο να φέρει εξωτερικά πλήρες πλέγμα και να παρέχει θωράκιση 100%.

Οι σύνδεσμοι τύπου "D" ή "Κυκλικοί" των καλωδίων, πρέπει να θωρακίζονται με μεταλλική θωράκιση. Εάν είναι εφαρμόσιμο, πρέπει να χρησιμοποιούνται μεταλλικοί στυπιοθλίπτες καλωδίων που να διαθέτουν ακροδέκτη σύνδεσης του πλέγματος του καλωδίου.
Το πλέγμα του καλωδίου πρέπει να συνδέεται στο μεταλλικό περίβλημα ή στον στυπιοθλίπτη και να θωρακίζεται και στα δύο άκρα κατά 360 μοίρες.
Η θωράκιση πρέπει να καταλήγει σε κάποιο ακροδέκτη γείωσης.

Για την διάταξη των ακροδεκτών: Παρακαλούμε αναφερθείτε στο εσώκλειστο εγχειρίδιο Οδηγιών.

Italiano

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Oggetto : Addendum al manuale di istruzioni.
Riferimento : Certificazione CE dei misuratori termici di portata in massa
Data : Gennaio 2000.

Questa strumentazione (elettrica ed elettronica) prodotta da Brooks Instrument, soggetta a marcatura CE, ha superato con successo le prove richieste dalla direttiva per la Compatibilità Elettomagnetica (Direttiva EMC 89/336/EEC).
E' richiesta comunque una speciale attenzione nella scelta dei cavi di segnale da usarsi con la strumentazione soggetta a marchio CE.
Qualità dei cavi di segnale e dei relativi connettori:
Brooks fornisce cavi di elevata qualità che soddisfano le specifiche richieste dalla certificazione CE. Se l'utente intende usare propri cavi, questi devono possedere una schermatura del 100%.
I connettori sia di tipo "D" che circolari devono possedere un guscio metallico. Se esiste un passacavo esso deve essere metallico e fornito di fissaggio per lo schermo del cavo.
Lo schermo del cavo deve essere collegato al guscio metallico in modo da schermarlo a 360° e questo vale per entrambe le estemità.
Lo schermo deve essere collegato ad un terminale di terra.
I connettori "Card Edge" sono normalmente non metallici. Il cavo impiegato deve comunque avere una schermatura del 100% per soddisfare la certificazione CE.

Lo schermo deve essere collegato ad un terminale di terra.
Per il corretto cablaggio dei terminali occorre fare riferimento agli schemi del manuale di istruzioni dello strumento.

Nederlands

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Onderwerp : Addendum voor Instructie Handboek
Referentie : CE certificering voor Mass Flow Meters & Controllers
Datum : Januari 2000.

Dames en heren,
Alle CE gemarkeerde elektrische en elektronische produkten van Brooks Instrument zijn met succes getest en voldoen aan de wetgeving voor Electro Magnetische Compatibiliteit (EMC wetgeving volgens 89/336/EEC).
Speciale aandacht is echter vereist wanneer de signaalkabel gekozen wordt voor gebruik met CE gemarkeerde produkten.
Kwaliteit van de signaalkabel en kabelaansluitingen:
Brooks levert standaard kabels met een hoge kwaliteit, welke voldoen aan de specificaties voor CE certificering. Indien men voorziet in een eigen signaalkabel, moet er gebruik gemaakt worden van een kabel die volledig is afgeschermd met een bedekkingsgraad van 100%. "D" of "ronde" kabelconnectoren moeten afgeschermd zijn met een metalen connector kap. Indien kabelwartels worden toegepast, moeten metalen kabelwartels worden gebruikt die het mogelijk maken het kabelscherm in te klemmen Het kabelscherm moet aan beide zijden over 360° met de metalen connectorkap, of wartel verbonden worden. Het scherm moet worden verbonden met aarde. "Card-edge" connectors zijn standaard niet-metallisch. De gebruikte kabels moeten volledig afgeschermd zijn met een bedekkingsgraad van 100% om te voldoen aan de CE certificering.

Het scherm moet worden verbonden met aarde.
Voor pin-configuraties a.u.b. verwijzen wij naar het bijgesloten instruktie handboek.
Hoogachtend,

Norsk

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Vedrørende : Vedlegg til håndbok
Referanse : CE sertifisering av utstyr for massestrømsmåling og regulering
Dato : Januar 2000.

Til den det angår
Brooks Instrument elektrisk og elektronisk utstyr påført CE-merket har gjennomgått og bestått prøver som beskrevet i EMC forskrift om elektromagnetisk immunitet, direktiv 89/336/EEC.
For å opprettholde denne klassifisering er det av stor viktighet at riktig kabel velges for tilkobling av det måletekniske utstyret.
Utførelse av signalkabel og tilhørende plugger:

- Brooks Instrument tilbyr levert med utstyret egnet kabel som møter de krav som stilles til CE-sertifisering.
- Dersom kunden selv velger kabel, må kabel med fullstendig, 100% skjerming av lederene benyttes. "D" type og runde plugger og forbindelser må være utført med kappe i metall og kabelnipler må være utført i metall for jordet innfesting av skjermen. Skjermen i kabelen må tilknyttes metallet i pluggen eller nippelen i begge ender over 360°, tilkoblet elektrisk jord.
- Kort-kantkontakter er normalt utført i kunststoff. De tilhørende flatkabler må være utført med fullstendig, 100% skjerming som kobles til elektrisk jord på riktig pinne i pluggen, for å møte CE sertifiseringskrav.

For tilkobling av medleverte plugger, vennligst se håndboken som hører til utstyret.
Vennlig hilsen

Português

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Assunto : Adenda ao Manual de Instruções
Referência : Certificação CE do Equipamento de Fluxo de Massa
Data : Janeiro de 2000.

O equipamento (eléctrico/electrónico) Brooks com a marca CE foi testado com êxito nos termos do regulamento da Compatibilidade Electromagnética (directiva CEM 89/336/EEC).
Todavia, ao seleccionar-se o cabo de sinal a utilizar com equipamento contendo a marca CE, será necessário ter uma atenção especial.
Qualidade do cabo de sinal, buchas de cabo e conectores:
A Brooks fornece cabo(s) de qualidade superior que cumprem os requesitos da certificação CE.
Se fornecerem o vosso próprio cabo de sinal, devem utilizar um cabo que, na sua totalidade, seja isolado com uma blindagem de 100%.
Os conectores tipo "D" ou "Circulares" devem ser blindados com uma blindagem metálica. Se tal for necessário, deve utilizar-se buchas metálicas de cabo para o isolamento do aperto do cabo.
O isolamento do cabo deve ser ligado à blindagem ou bucha metálica em ambas as extremidades em 360º.
A blindagem deve terminar com a ligação à massa.
Os conectores "Card Edge" não são, em geral, metálicos e os cabos utilizados devem ter um isolamento com blindagem a 100% nos termos da Certificação CE..

A blindagem deve terminar com ligação à massa.
Relativamente à configuração da cavilha, queiram consultar o Manual de Instruções.

Suomi

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Asia : Lisäys Käyttöohjeisiin
Viite : Massamäärämittareiden CE sertifiointi
Päivämäärä : Tammikuu 2000

Brooksin CE merkillä varustetut sähköiset laitteet ovat läpäissyt EMC testit (direktiivi 89/336/EEC).
Erityistä huomiota on kuitenkin kiinnitettävä signaalikaapelin valintaan.
Signaalikaapelin, kaapelin läpiviennin ja liittimen laatu
Brooks toimittaa korkealaatuisia kaapeleita, jotka täyttävät CE sertifikaatin vaatimukset. Hankkiessaan signaalikaapelin itse, olisi hankittava 100%:sti suojattu kaapeli.
"D" tai "Circular" tyyppisen liitimen tulisi olla varustettu metallisuojalla. Mikäli mahdollista, tulisi käyttää metallisia kaapeliliittimiä kiinnitettäessä suojaa.
Kaapelin suoja tulisi olla liitetty metallisuojaan tai liittimeen molemmissa päissä 360°:n matkalta.
Suojan tulisi olla maadoitettu.
"Card Edge Connector"it ovat standarditoimituksina ei-metallisia. Kaapeleiden täytyy olla 100%: sesti suojattuja jotta ne olisivat CE sertifikaatin mukaisia.
Suoja on oltava maadoitettu.

Nastojen liittäminen; katso liitteenä oleva manuaali.
Ystävällisin terveisin,

Svensk

Brooks Instrument
407 West Vine St.
Hatfield, PA 19440
U.S.A.

Subject : Addendum to the Instruction Manual
Reference : CE certification of Mass Flow Equipment
Date : January 2000

Brooks (elektriska / elektronik) utrustning, som är CE-märkt, har testats och godkänts enligt gällande regler för elektromagnetisk kompabilitet (EMC direktiv 89/336/EEC).
Speciell hänsyn måste emellertid tas vid val av signalkabel som ska användas tillsammans med CE-märkt utrustning.
Kvalitet på signalkabel och anslutningskontakter:
Brooks levererar som standard, kablar av hög kvalitet som motsvarar de krav som ställs för CE-godkännande.
Om man använder en annan signalkabel ska kabeln i sin helhet vara skärmad till 100%.
"D" eller "runda" typer av anslutningskontakter ska vara skärmade. Kabelgenomföringar ska vara av metall alternativt med metalliserad skärmning.
Kabelns skärm ska, i bada ändar, vara ansluten till kontakternas metallkåpor eller genomföringar med 360 graders skärmning.
Skärmen ska avslutas med en jordförbindelse.
Kortkontakter är som standard ej metalliserade, kablar som används måste vara 100% skarmade för att överensstämma med CE-certifieringen.

Skärmen ska avslutas med en jordförbindelse.
För elektrisk anslutning till kontaktstiften hänvisas till medföljande instruktionsmanual.

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SL6800 Series Pressure Controllers

LIMITED WARRANTY

Seller warrants that the Goods manufactured by Seller will be free from defects in materials or workmanship under normal use and service and that the Software will execute the programming instructions provided by Seller until the expiration of the earlier of twelve (12) months from the date of initial installation or eighteen (18) months from the date of shipment by Seller. Products purchased by Seller from a third party for resale to Buyer ("Resale Products") shall carry only the warranty extended by the original manufacturer.

All replacements or repairs necessitated by inadequate preventive maintenance, or by normal wear and usage, or by fault of Buyer, or by unsuitable power sources or by attack or deterioration under unsuitable environmental conditions, or by abuse, accident, alteration, misuse, improper installation, modification, repair, storage or handling, or any other cause not the fault of Seller are not covered by this limited warranty, and shall be at Buyer's expense.

Goods repaired and parts replaced during the warranty period shall be in warranty for the remainder of the original warranty period or ninety (90) days, whichever is longer. This limited warranty is the only warranty made by Seller and can be amended only in a writing signed by an authorized representative of Seller.

BROOKS LOCAL AND WORLDWIDE SUPPORT

Brooks Instrument provides sales and service facilities around the world, ensuring quick delivery from local stock, timely repairs and local based sales and service facilities.

Our dedicated flow experts provide consultation and support, assuring successful applications of the Brooks flow measurement and control products.

Calibration facilities are available in local sales and service offices. The primary standard calibration equipment to calibrate our flow products is certified by our local Weights and Measures Authorities and traceable to the relevant international standards.

START-UP SERVICE AND IN-SITU CALIBRATION

Brooks Instrument can provide start-up service prior to operation when required.

For some process applications, where ISO-9001 Quality Certification is important, it is mandatory to verify and/or (re)calibrate the products periodically. In many cases this service can be provided under in-situ conditions, and the results will be traceable to the relevant international quality standards.

CUSTOMER SEMINARS AND TRAINING

Brooks Instrument can provide customer seminars and dedicated training to engineers, end users and maintenance persons. Please contact your nearest sales representative for more details.

HELP DESK

In case you need technical assistance:

Americas	☎ 1-888-554-FLOW
Europe	☎ +(31) 318 549265
Asia	☎ +011-81-3-5633-7105

Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

TRADEMARKS

Brooks ..... Brooks Instrument Div., Emerson Electric Co.
DeviceNet ..... Open DeviceNEt Vendors Association, Inc.
Emerson ..... Emerson Electric Co.
ODVA ..... Open DeviceNEt Vendors Association, Inc.
VCR ..... Cajon Co.

ISO 9001
QUALITY SYSTEM
Certificate of Conformity
The Quality System at Brooks Instrument conforms to the quality standards set forth in ISO 9001.

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